

Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Cave Spring Branch

Waterbody Segment at a Glance:

County:	McDonald
Nearby Cities:	Noel, Southwest City
Length of impairment:	0.2 miles
Pollutant:	Nutrients
Source:	Nonpoint Sources and Simmons Foods, Inc.



State map showing location of watershed

TMDL Priority Ranking: Medium

Description of the Problem

Beneficial uses of Cave Spring Branch

- This stream is not classified so no beneficial uses are assigned to it; however, all waterbodies in Missouri are protected by the general criteria (standards) contained in Missouri's Water Quality Standards (WQS), 10 CSR 20-7.031.

Use that is impaired

- None, since no beneficial uses can be assigned.

Standards that apply

- The general criteria that apply in this case WQS 10 CSR 20-7.031 (3)(A), (C) and (G), which state:
 - Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
 - Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.
 - Waters shall be free from conditions harmful to aquatic life (paraphrased).

Throughout much of the 1990s, Cave Spring Branch suffered several episodes of very poor water quality due to malfunctions of the wastewater treatment facilities at the Simmons poultry processing plant. Of particular concern were occasional acutely toxic levels of ammonia during times of treatment plant malfunction. Also, chronic problems with high levels of nitrogen and phosphorus stimulated excessive algae growth in Cave Springs Branch. By 1999, improvements to the wastewater treatment facilities had improved water quality in Cave Spring Branch. However, the combination of nutrient discharges from this facility and nutrients reaching the creek due to the application of poultry litter in the watershed is still responsible for abnormally high levels of nutrients in Cave Spring Branch.

Time Trends in Nitrate in Cave Springs Br. at State Line

The graph displays the concentration of nitrate (NO₃N) in mg/L over time from 1998 to 2004. The y-axis represents NO₃N (mg/L) ranging from 0 to 120. The x-axis represents the Year from 1998 to 2004. The data shows a significant peak in nitrate levels in late 1998, reaching approximately 110 mg/L, followed by a sharp decline to near zero by early 1999, and remaining low through 2004.

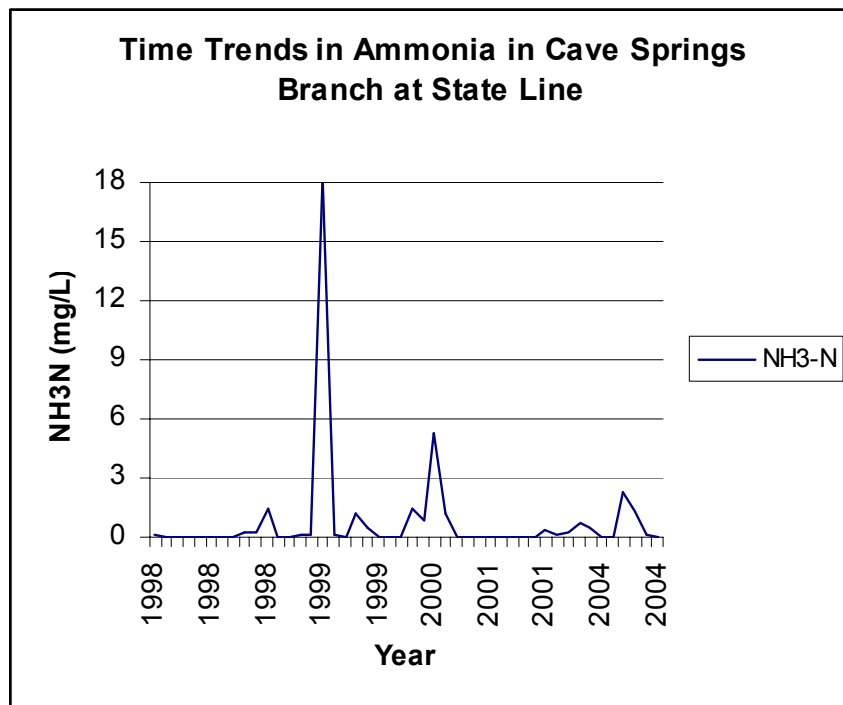
Year	NO ₃ N (mg/L)
1998-01-01	5
1998-03-01	15
1998-05-01	10
1998-07-01	25
1998-09-01	40
1998-11-01	55
1998-12-31	110
1999-01-01	105
1999-03-01	55
1999-05-01	105
1999-07-01	25
1999-09-01	60
1999-11-01	45
1999-12-31	45
2000-01-01	20
2000-03-01	40
2000-05-01	10
2000-07-01	8
2000-09-01	2
2000-11-01	5
2000-12-31	5
2001-01-01	5
2001-03-01	5
2001-05-01	5
2001-07-01	5
2001-09-01	8
2001-11-01	5
2001-12-31	8
2002-01-01	5
2002-03-01	5
2002-05-01	10
2002-07-01	10
2002-09-01	10
2002-11-01	10
2002-12-31	10
2003-01-01	10
2003-03-01	10
2003-05-01	10
2003-07-01	10
2003-09-01	10
2003-11-01	10
2003-12-31	10
2004-01-01	10
2004-03-01	10
2004-05-01	10
2004-07-01	10
2004-09-01	10
2004-11-01	10
2004-12-31	10

Time Trends in Phosphorus Levels in Cave Springs Br. at State Line

The graph displays the total phosphorus levels in mg/L over time. The y-axis ranges from -1 to 11 mg/L with major gridlines every 2 units. The x-axis shows years from 1998 to 2004. The data is represented by a red line. The phosphorus levels start at approximately 0.5 mg/L in early 1998, rise to a peak of about 1.2 mg/L, then fluctuate between 1 and 8 mg/L through 1999. A major peak occurs in early 1999 at approximately 9.5 mg/L. Following this, the levels drop sharply to around 1 mg/L by mid-1999, then rise to another peak of about 5.8 mg/L in late 1999. From early 2000 onwards, the phosphorus levels remain consistently low, fluctuating slightly around 0.5 mg/L through 2004.

Year	Total Phosphorus (mg/L)
1998 (Jan)	0.5
1998 (Mar)	1.2
1998 (May)	0.8
1998 (Jul)	1.0
1998 (Sep)	3.5
1998 (Nov)	4.5
1999 (Jan)	8.0
1999 (Mar)	4.8
1999 (May)	6.2
1999 (Jul)	6.0
1999 (Sep)	0.2
1999 (Nov)	7.5
2000 (Jan)	9.5
2000 (Mar)	2.5
2000 (May)	7.5
2000 (Jul)	1.0
2000 (Sep)	1.5
2000 (Nov)	5.8
2001 (Jan)	1.5
2001 (Mar)	0.5
2001 (May)	0.5
2001 (Jul)	0.5
2001 (Sep)	0.5
2001 (Nov)	0.5
2002 (Jan)	0.5
2002 (Mar)	0.5
2002 (May)	0.5
2002 (Jul)	0.5
2002 (Sep)	0.5
2002 (Nov)	0.5
2003 (Jan)	0.5
2003 (Mar)	0.5
2003 (May)	0.5
2003 (Jul)	0.5
2003 (Sep)	0.5
2003 (Nov)	0.5
2004 (Jan)	0.5
2004 (Mar)	0.5
2004 (May)	0.5
2004 (Jul)	0.5
2004 (Sep)	0.5
2004 (Nov)	0.5

Ammonia as nitrogen (NH₃N) levels in Cave Spring Branch, with the exception of one sampling period in 1999, have been well below levels that cause acute toxicity.



For more information call or write:

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